REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1, 9, 27 and 29-43 are pending in the present application. Claims 1, 9 and 27 are amended and Claims 38-43 are added by the present amendment. Claims 2, 3, 5, 6, 8, 10-15, 17-22, 24-26 and 28 were previously canceled and Claims 4, 7, 16 and 23 stand withdrawn as directed to non-elected inventions.

Amendments to Claims 1, 9 and 27 find support in the originally filed specification at least at page 14, line 10, to page 15, line 25, and new Claims 38-43 find support in the originally filed specification at least at page 20, line 14, to page 21, line 7. Thus, no new matter is added.

In the outstanding Office Action, Claims 1, 9 and 27 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,173,865 to Koike et al. (herein "Koike") and Claims 29-37 were rejected under 35 U.S.C. § 103(a) as unpatentable over Koike.

Applicants respectfully traverse the rejection of Claims 1, 9 and 27 as anticipated by Koike under 35 U.S.C. § 102(b).

Amended Claim 1 is directed to an image recognition method for recognizing an object. The object is captured to generate a range image having three-dimensional information representing a three-dimensional shape of the object. A three-dimensional deformed image (e.g., three-dimensional model) is obtained by three-dimensionally deforming the range image. The deformed image is compared with a newly captured range image to recognize a three-dimensional motion of the object. Claims 9 and 27 each include similar features.

Koike discloses an apparatus for detecting motions of a moving picture by preparing a three-dimensional model corresponding to a solid configuration of a three-dimensional

object, and obtaining an area in a previous frame picture where the three-dimensional object and the three-dimensional model overlap. The area is divided into a plurality of blocks, and a velocity vector between the current input image and the previous frame image is obtained for each block. The depth information in the block is obtained from the three-dimensional model, and three-dimensional motion parameters of the three-dimensional object are obtained from the velocity vectors and depth information. The three-dimensional model is previously prepared as shown in FIG. 2, and is not generated by deforming the captured image.

More specifically, Koike does not teach or suggest generating the three-dimensional model by deforming the captured image. Also, Koike does not teach or suggest generating a range image having three-dimensional information representing a three-dimensional shape of an object. Koike uses a digital image inputted from a television camera and stored in an image memory. The digital image of Koike is a two-dimensional image, not a three-dimensional image, because the depth coordinate must be obtained separately. As noted in Koike, "[i]t is therefore necessary to obtain the depth coordinate of the object simultaneously with the estimation of the three-dimensional motion parameters."[1] Further, Koike describes that "[t]o meet with this requirement, the three-dimensional motion parameter estimator is needed to solve nonlinear simultaneous equations including nonlinear terms (Ry-z and Rx-z) which are the products of Rx and Ry representing rotational movement of the three-dimensional object and z representing its depth coordinate."[2] The nonlinear simultaneous equations of Koike are not used for a three-dimensional image, and Koike uses the nonlinear simultaneous equations because the image is a two-dimensional image. Furthermore, Koike describes, refers to using only a two-dimensional image for which it is necessary to obtain a depth coordinate in the three-dimensional object.[3]

In addition, Koike describes a system for detecting three-dimensional motion of a three-dimensional object by obtaining, for each block, a velocity vector from two temporally

[1] Koike at column 4, lines 1-3.
[2] Koike at column 4, lines 3-9.
[3] Koike at column 4, lines 10-12.

successive images of a moving picture including the three-dimensional object.[4] This corresponds to the conventional three-dimensional motion estimating method described in Koike which estimates three-dimensional motion parameters of an object through utilization of only information about an apparent velocity vector between two successive images. In other words, Koike deals with a two-dimensional image. Further, in FIG. 3, Koike shows a triangle of the three-dimensional model in a block used in a depth coordinate calculating section and this figure shows only a two-dimensional image. Thus, Koike fails to teach or suggest "generating a three-dimensional deformed image by three-dimensionally deforming the range image," or generating "a range image having three-dimensional information representing a three-dimensional shape of the object," as recited in the amended independent claims.

Accordingly, Applicants respectfully submit Claims 1, 9, and 27 patentably define over Koike.

Further, Applicants respectfully traverse the rejection of Claims 29-37 as unpatentable over Koike under 35 U.S.C. § 103(a).

Claims 29-37 depend on Claims 1, 9 or 27, which as discussed above are believed to patentably define over Koike. Further, Applicants respectfully traverse the assertion in the Office Action that Koike describes performing 3D motion analysis on an object which has undergone motion by comparing two temporally successive images.[5] Koike indicates that by substituting in Eq. (1) the coordinates of a plurality of points on the object in the current and previous frames and solving Eq. (1) for Rx, Ry, Rz, Tx and Tz, a three-dimensional motion of the object is estimated.[6] In other words, Koike describes performing a three-dimensional analysis using Eq. (1). Further, Koike indicates that an image of the previous frame is blocked, a velocity vector between the input image and the previous frame image is obtained for each block, and an equation of motion concerning the three-dimensional object is set up

---

[4] Koike at column 1, lines 40-44.
[5] Office Action at page 4, lines 1-2 of last paragraph.
[6] Koike at column 3, lines 18-33.

on the basis of Eq. (1).[7] In other words, Koike describes calculating a feature amount such as a velocity vector from two images, and performing a three-dimensional analysis based on the calculated feature amount. Thus, Koike performs a three-dimensional analysis by comparing feature amounts with each other, which is different than comparing images with each other and in particular is different than "comparing the deformed image with a newly captured range image," as in the amended independent claims.

Accordingly, Applicants respectfully submit that amended independent Claims 1, 9 and 27, and claims depending thereform are allowable.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Eckhard H. Kuesters
Attorney of Record
Registration No. 28,870

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)

EHK:ZSS:dnf

I:\ATTY\ZS\0039\0039-7495-2SRD\0039-7495 AMENDMENT 110904.DOC

[7] Koike at column 4, lines 45-67.